

Pharmacognosy II



Seeds Summary



SEEDS

Definition:

Plant organs resulting from fertilization of mature ovules after pollination process to continue distribution of plants (**Fertilized ovule surrounded by endosperm and testa**).

Composition of ovules:-

integuments (seed coat), nucellus (perisperm) , embryo sac (Endosperm), funicle (hilum) , chalaza , micropyle .

Types of ovules:

(1) Orthotropous (atropous) hilum, funicle and micropyle on the same line e.g. family cannabinaceae - nux vomica (with no raphe).

(2) Anatropous (ovule bent by 180 degree on the hilum) micropyle neighboring the hilum e.g. linseed , cardamom (raphe half of the seed).

(3) Amphitropous (ovule bent by 90 degree on the hilum) e.g. colchicum (raphe quarter of the seed)

(4) Campylotropous (unequal growth of different parts of the ovule - Curved) e.g. datura seed (no raphe).

***Raphe**: vascular bundle between funicle and chalaza (absent in atropous and campylotropous seeds present in anatropous and amphitropous seeds)

***Hilum**: a scar left on the seed where it separates from the placenta

***Micropyle**: minute opening in the seed coat usually marks the position of the radicle.

*** Histology of the seeds**

(A) Testa: Consists typically of 5 layers those are

(I) Epidermis (characteristic for each seed)

- Parenchyma filled with mucilage e.g. black mustard - linseed
- Prosenchymatous e.g. cardamom
- Palisade like e.g. foenugreeek
- Sclerenchymatous e.g. datura, hyoscymous
- Sclerides carrying lignified hairs e.g. 10 ribs nux vomica, 1 rib strophanthus.

(2) Hypodermis (characteristic for each seed)

It may be collenchyma (linseed), collapsed parenchyma (nux vomica), basket like (foenugreek) giant cells (black mustard)

(3) Sclerieds

It may be present or absent (characteristic for each seed) with funnel shaped lumen and silica nodule (cardamom)

Unequal in length and thickening (black mustard)

Unequal in thickening and elongated (linseed)

(4) Nutritive layer

(Collapsed parenchyma containing remains of reserved food materials e.g. starch, oil droplets, aleurone layer in foenugreek)

(5) Pigment layer (May be present e.g. black mustard, linseed or absent white mustard).

(B) Kernal (perisperm + endosperm + embryo)

Perisperm may be present {Polygonal cells with straight anticlinal walls filled with starch grains e.g. cardamom or membranous e.g. Castor seed} or absent e.g. Linseed.

Endosperm may be:

Present {Albuminous seeds}

- Polygonal cells fleshy with straight anticlinal walls filled with aleurone grains and oil droplets {linseed}
- Starchy {graminae}.
- Mucilaginous (Foenuugreek),
- hemicellulosic or horny (Nux vomica and psyllium)

Absent (Exalbuminous seeds e.g. Black mustard)

Embryo (Plumule + radicle+ cotyledons) May be:

- Filling most of the kernal (Linseed)
- Marginal (Nux vomica)

* Histology of embryo

Small polygonal cells with thick straight anticlinal walls filled with aleurone grains

{Typical} with globoid and crystalloid

{Atypical} with globoid or even amorphous matter and oil droplets.

* Shapes (types) of embryo (characteristic for each seed)

- (1) Straight e.g. linseed
- (2) Curved e.g. papaver seed
- (3) Coiled e.g. Datura seed
- (4) Spirally coiled e.g. Cannabinaceae
- (5) Bent on itself :-

(a) Incurbent: bent against one of the 2 cotyledons

(b) Accumbent: bent against the 2 cotyledons e.g. Foenugreek

(c) Orthoplocus : enclosed between the 2 cotyledons e.g. Black mustard.

* Outgrowths (any structure more than the testa and kernal)

- (1) Plume: Tufts of hairs coming out from the testa e.g. argei seed
- (2) Awn: Tufts of hairs on a stalk coming out from the testa e.g. strophanthus
- (3) Arillus: membranous outgrowth coming out from the tissues of the Funicle e.g. cardamom covering most of the seed
- (4) Arillode: membranous outgrowth coming out from the tissues of the hilum and micropyle e.g. nutmeg covering part of the seed
- (5) Caruncle: fleshy outgrowth coming out from the neighboring tissues of the micropyle e.g. castor seed
- (6) Wing: winged membranous outgrowth to help in seed transfer e.g. pinus
- (7) Strophiole: enlargement of the testa of the seed over the position of the raphe (increased formation of parenchyma) e.g. colchicum seed

Official Seeds

SEED	ORIGIN	KEY ELEMENT, TEST	A.C, USES
Cardamom الحيهان الهيل	Dried ripe or nearly ripe seeds of <i>Elatteria cardamomum</i> recently separated from fruits F. zingibraceae Recently separated from fruits to prevent loss of volatile ils	Prosenchymatous epidermal cells traversed by collapsed hypodermal cells + oil layer Sudan III (red) Adultrants: cardamom husk, loosy seeds, wormy seeds	V.O Terpinyl acetate + starch Digestive Hepatoprotective Cholagogue Condiment Carminative
Foenugreek الحلبة	Dried ripe seeds of <i>Trigonella foenum greacum</i> F. leguminoseae {With accumbent embryo}	Palisade like cells + basket like cells + Aleurone layer M.B. test histochemical test (blue striation) Neutral mucilage No colour with Ruthenium Red	- Steroidal saponins F.O, mucilage and protein - Lactagogue, Bulk laxitive for elderly (not used for pregnants) , Antidiabetic precursor for cortisone, sex hormones, contraceptives
Black mustard {Orthoplocus embryo} الخردل الاسود	Dried ripe seeds of <i>Brassica nigra</i> F. cruciferae	Network like structure of the testa of seed coat + pigment cells Slippery touch between 2 moist fingers + pungent odour Millon's test no red	Sinigrin gives volatile allyl isothiocyanate + myrosin enzyme +mucilage Condiment, Rubifecient (not for varicose veins vesicant)

<p>White mustard الخردل الابيض</p>	<p>Dried ripe seeds of <i>Brassica alba</i> F. cruciferae</p>	<p>Epidermal cells filled with mucilage+ pigment cells free from content</p> <p>Slippery touch between 2 moist fingers+ no pungent odour</p> <p>Millon's test red</p>	<p>Sinabin gives non volatile acrinyl isothiocyanate Myrosin (more active than singrin - mucilage</p> <p>Condiment, Rubifecient</p>
<p>Linseed {Straight embryo} بذر الكتان</p>	<p>Dried ripe seeds of <i>Linum usitatum</i> F. lineaceae</p> <p>Non ripe seeds contains starch and free prussic acid (toxic)</p> <p>Not toxic to man as the glucosidase enzyme inhibited in GIT by acids</p>	<p>Mat like structure + pigment layer pitted + Typical aleurone grain</p> <p>Guignard test (linamarin test) (brick red)</p> <p>R.R. Red colour acidic mucilage</p>	<p>Cyanogenic Linamarin glycoside Mucilage + EFAs (Essential fatty acids)</p> <p>(Cataplasma, Demulcent, laxative and source for PUFA {omega-3 fatty acids }, Clothes, Paper, cattle food</p>
<p>Nux vomica الجوز المقبي</p>	<p>Dried ripe seeds of <i>Strychnos nux vomica</i> F. loganeaceae</p>	<p>Lignified epidermal cells (sclerieds) carrying 10 lignified broken ribs+ lignified broken ribs+ hemicellulosically thickened endosperm</p> <p>Sulphvanidic acid test (Mandlin's) violet colour Allied: <i>S. nux ignati</i> Oval, low A.C. No hairs</p>	<p>Strychnine, brucine {Indole type Alkaloids}</p> <p>Stimulant Analeptic Bitter tonic</p> <p>Toxicity Violent convulsion and Asphyxiation</p>

Psyllium Flea seed بذر قاطونة بذر البرغوثة	Dried ripe seeds <i>Plantago psyllium</i> and <i>Plantago albicans</i> and other species except <i>P. lanceolatus</i> F. plantagonaceae	Pitted hemicellulosically thickend endosperm - epidermal cells dorsal and ventral view Swelling factor with water not less than 12.5 adultrants: <i>Plantago lanceolatus</i> detected by low swelling factor	Mucilage in dorsal epidermis (psillium husk), F.O Bulk Laxitive Anti-diabetic Haemorrhoids Irritable bowl syndrome (IBS)
Nutmeg جوز الطيب	Dried seeds of <i>Myrestica</i> <i>fragrance</i> deprived from its mace and most of its testa (limed or non limed) F. myresticaceae Limed {to prevent insect growth}	Oil cells + feathery crystals of fats + starch grains - Atypical aleurone grain with crystalloid} Sudan III red I_2 test blue Chloral hydrate feathry Adultrants:- factitious nutmeg detected by starch - low V.O. - (mace)	V.O maily {myresticin} Fats - Tannins Condiment Stimulant Diarrhea - Chronic Rheumatism
Strophanthus Arrow poison seed الاستروفانثوس	Dried ripe seeds of <i>Strophanthus hispidus</i> , <i>Strophanthus gratus</i> and <i>strophanthus kombe</i> Family apocyanaceae deprived from its Awn	Epidermal cell tangentially lignified with non glandular lignified hairs with one rib 66% H ₂ SO ₄ Red (gratus) - Green with (<i>S. kombe</i> - <i>S. hispidus</i>) Baljet test: Orange Red Kadde's reagent Violet Keller Killiani Brown ring	Cardiac glycosides (Cardinolides) - Strophanthosid es K, G, H Quabain {Non cumulative} - I.V. Acute attacks of Congestive heart failure - diuretic

Non Official Seeds

<p>Nigella seed Black seed, black cumin, black caraway حبة البركة</p>	<p>Dried ripe seeds of <i>Nigella sativa</i> L. Family Ranunculaceae</p>	<p>Epidermal cells papillose + pigment cells</p>	<p>- Volatile oils thymoquinone. - PUFA {linoleic acid (Omega 6) - linolenic acid (Omega 3)}</p> <p>Immunostimulant Antitumour. Antiasthmatic. Carminative. Arteriosclerosis</p>
<p>Castor seed بذر الخروع</p>	<p>Dried ripe seeds of <i>ricinus communis</i> F. euphorbiaceae</p>	<p>Sudan III red</p>	<p>Alkaloid ricinine F.O - protein</p> <p>Laxative</p>
<p>Coffee seed حبوب القهوة</p>	<p>Dried ripe seeds of <i>Coffea arabica</i> F. Rubiaceae</p> <p>{Roasting liberate caffeine, caffeine odour, darkness}</p>	<p>Murexide Test for caffeine gives crimson red then violet - can detect Green seed</p>	<p>Caffeine alkaloid, tannins</p> <p>Diuretic, CNS Stimulant, Astringent</p>
<p>Colchicum Meadow saffron الصلحاح</p>	<p>Dried ripe seeds of <i>Colchicum autumnale</i> F. liliaceae {Amhitropus ovule - Strophiole outgrowth}</p>	<p>Hemicellulosically thickened endosperm - starch grains</p> <p>Conc.HNO₃ reddish violet</p>	<p>Colchicine {in testa}, resin</p> <p>Anti-gout Cytotoxic In polyploidy</p>

<p>Horse chest nut Semen Hippocastani; Aesculus ابو فروة الحصان</p>	<p>Dried and fresh kernal of <i>Aesculus</i> <i>hippocostanum</i> Family Hippocastamaceae</p>	<p>Triterpenoid Saponin α and β escin. * Flavones. * Coumarins. * Tannins.</p> <p>Varicose veins, haemorrhoids, antiiodema and anti-inflammatory (phlebitis)</p>
<p>Pumpken seed بذر القرع</p>	<p>Dried ripe seeds of <i>Cucurbita pepo</i> F. cucurbitaceae</p>	<p>- Unsaturated fatty acids - Phytosterols - Selenium</p> <p>Prostatitis BPH Male infertility Baldness Atherosclerosis</p>
<p>Evening primrose {<i>Oenothera</i>} حشيشة الحمار</p>	<p>Dried ripe seeds of <i>Oenothera biennis</i> family Onagraceae</p>	<p>EPO Evening primrose oil γ-linolenic acid (GLA). Diabetic neuropathy. Premenstrual syndrome Eczema, psoriasis and rheumatoid arthritis</p>